Abstract Submitted
for the HAW05 Meeting of
The American Physical Society

Refinement of Approximate Energy Expressions for Nuclear Matter by Taking into Account Tensor Correlations KAZUNORI TANAKA, KAZUMASA EBINUMA, MASATOSHI TAKANO, Waseda University — Approximate energy expressions are refined for infinite zero-temperature nuclear matter by taking into account tensor correlations. They are explicitly expressed as functionals of spin-isospin-dependent radial distribution functions, tensor distribution functions and spin-orbit distribution functions, and can be used conveniently in the variational method. Before this refinement, nuclear matter energies calculated with this variational method were too low, possibly due to insufficiency of the expressions for the kinetic energy caused by noncentral correlations. Compared with the expectation values of the Hamiltonian, the two-body cluster terms are found to be included completely in the previous energy expressions, while the three-body cluster terms are not included sufficiently. Therefore, in this study, the main parts of the three-body-cluster kinetic-energy terms composed of the central and the tensor correlations are added to the previous expressions, as the first step of the refinement. The Euler-Lagrange equations are derived from the refined energy expressions and numerically solved for neutron matter with the AV18 potential. The results are considerably improved.

Kazunori Tanaka
Waseda Univ.

Date submitted: 25 May 2005 Electronic form version 1.4